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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,782	07/15/2003	Dirk J. Sundt	501085.02	1121

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EXAMINER	
HU, SHOUXIANG	

ART UNIT	PAPER NUMBER
2811	

MAIL DATE	DELIVERY MODE
01/10/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/620,782	SUNDT ET AL.	
	Examiner	Art Unit	
	Shouxiang Hu	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *25,26,28,33-36 and 42-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *25,26,28,33-36 and 42-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 43 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 43 recites the limitation "the opening of the silicon oxide mask layer" in the claim. There is insufficient antecedent basis for either of such opening or such mask layer as recited in the limitation in the claim.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 33-36, 42, 44 and 45 are rejected under 35 U.S.C. 102(a) as being anticipated by Koga (US 6,177,331).

Koga discloses a semiconductor structure in the embodiment of Figs. 1a-1e, comprising:

a trench formed in a substrate (101);

a first layer of a silicon nitride (110 or 103) formed over the substrate, having a opening (tapered and/or faceted) formed therethrough over the trench, the opening having a first dimension along the lower surface of the first layer and a second dimension along the upper surface of the first layer, wherein the first dimension is smaller than the second dimension and substantially equal the width of the underlying trench;

a pad layer (102) between the substrate (101) and the first layer of silicon nitride material (110 or 103); and,

an insulating layer (112; silicon oxide) formed on the first layer and extending into the opening and the trench.

Regarding claim 34, the materials of the substrate and the silicon nitride layer (64) can naturally be selectively etched with respect to one another

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 25, 26, 28 and 43, insofar as being in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Koga (US 6,177,331) in view of Witek (Witek et al., US 6,146,970) and/or Noguchi (Noguchi et al., US 2001/0030367).

Koga discloses a semiconductor structure in the embodiment of Figs. 3a-3d, comprising:

a trench formed in a substrate (101);

a first layer (a middle portion and a top portion of the protection layer structure 105 or 108) formed over the substrate, having a tapered opening (or faceted) formed therethrough over the trench, the opening having a first dimension on a first surface of the first layer adjacent to the trench and a second dimension on a second surface of the first layer opposite to the first surface, wherein the first dimension is smaller than the second dimension and substantially equal the width of the underlying trench;

a pad layer (a bottom portion of the protection layer structure 105 or 108) between the substrate (101) and the above identified first layer of silicon nitride material; and,

a mask layer (106) formed over the above identified first layer, the mask layer having an opening therethrough positioned over the tapered opening and having a dimension less than the second dimension of the tapered opening of the above identified first layer.

Koga does not expressively disclose that the materials for the protection layer structure (105 or 108) and the mask layer can be switched so that the protection layer structure can be formed of silicon nitride and/or that the mask layer can be formed of silicon oxide.

However, one of ordinary skill in the art would readily recognize that the protection layer structure (105 or 108) in Koga functions as an etching stopper layer

underlying the mask layer (106; particularly see Fig. 3b); that it is art-known that silicon oxide layer and silicon nitride layer are commonly used as a mask layer and an etching stopper layer in either orders because of their well known etching selectivity between the them in either dry and wet etchings, as readily evidenced in Witek (see col. 8, lines 43-46); and/or that silicon nitride layer is also commonly used as an etching stopper layer underlying a silicon oxide mask layer, as evidenced in Noguchi (see the silicon oxide mask layer 39 and the underlying silicon nitride etching stopper layer 38 in Figs. 50 and 51; also see [0295]).

Therefore, it would have been obvious to one of ordinary skill in the art to make the semiconductor structure of Koga with the protection layer structure being formed of silicon nitride and/or with the mask layer being formed of a silicon oxide, per the teachings of Witek and/or Noguchi, so that a semiconductor structure with desired material choice for the protection layer structure and/or the mask layer would be obtained, since it has been held that:

The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

And, with the protection layer structure being formed of silicon nitride material in the above collectively taught semiconductor structure, the bottom portion of such protection layer structure is still readable as the recited pad layer in a manner substantially same as or similar to that in the protection layer structure in Koga.

Furthermore, it is noted any potential process implications associated with the above collectively taught structure, and/or any potential process implications regarding how the pad layer (i.e., the bottom portion of the protection layer structure) and/or the silicon nitride layer (the middle and top portions of the protection layer structure) are formed in the above collectively taught semiconductor structure, would all be regarded as process limitations. However, such process limitations would not carry patentable weight in the claims drawing to a structure, because distinct structure is not necessarily produced. In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985).

Response to Arguments

7. Applicant's arguments filed on October 18, 2007, have been fully considered but they are not persuasive. And, responses to them have been fully incorporated into the claim rejections set forth above in this office action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is 571-272-1654. The examiner can normally be reached on Monday through Friday, 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SH
January 4, 2008

SHOUXIANG HU
PRIMARY EXAMINER